
Statistics 8810
Topics in Advanced Stochastic Processes
Statistical Inference for Stochastic Differential Equations
Autumn 2019

CONTACT INFORMATION

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Office hours: W 11:00am-12:00pm, 223 Cockins Hall.

CLASS INFORMATION

Location: Lecture: WF 9:10am – 11:00am CM0119.
Website: <http://osu.instructure.com/>

REFERENCES:

- *Statistics of Stochastic Processes I and II* by R.S. Lipster, A.N. Shiryaev and B. Aries, Springer, 2000;
- *Statistical Inference for Ergodic Diffusion Processes* by Y. Kutoyants, Springer, 2010;
- *Brownian Motion and Stochastic Calculus* by I. Karatzas and S. Shreve, Springer, 1991;
- *Probability and Measure*, by Patrick Billingsley, Wiley, 1995.
- Other resources will be announced in class.

COURSE DESCRIPTION AND OBJECTIVES

Stochastic differential equations (SDEs) model the stochastic evolution of a system as time evolves. These models have a variety of applications in many disciplines (economics, mathematical finance, biology, genetic analysis, oceanography, ecology, etc.) and emerge naturally in the study of many phenomena. This course will introduce the audience to the fundamental concepts used in SDEs, with emphasis on statistical estimation in the parametric and nonparametric setting. Structurally the course will be divided in three parts: 1) a primer on stochastic processes, stochastic calculus and stochastic differential equations; 2) estimation methods for SDEs accompanied by numerical simulations and 3) applications and case studies.

PREREQUISITES

Students are expected to have sufficient background in advanced probability (STAT 7201 or equivalent), advanced inference and basic knowledge of a scientific programming language (R, Matlab, Fortran or C).

EVALUATION

Evaluation will be based on two take-home assignments.

ATTENDANCE POLICY

It is strictly required to attend all the classes. It is the student's responsibility to make up for the material covered in class during any absence.

SPECIAL ACCOMMODATIONS

If you need any accommodations based on the impact of a documented disability, contact the instructor privately to discuss specific needs, within a week. You should also contact the Office of Disability Services to coordinate special accommodations.

ACADEMIC MISCONDUCT

Academic misconduct **will not be tolerated** and will be dealt with procedurally in accordance with university policy. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (<http://studentaffairs.osu.edu/csc/>).

DISCLAIMER

This syllabus should be taken as a fairly reliable guide for the course content. However, you cannot claim any rights from it and in particular I reserve the right to change the methods of assessment. Official announcements will ALWAYS be those made in class.